CLAIMS

1/ A system for cooling an injector of a combustion chamber of a turbomachine, said injector comprising means for delivering a primary fuel comprising a first feed tube connected to an annular injection piece having first injection orifices for discharging the primary fuel into said combustion chamber; and means for delivering a secondary fuel comprising a second feed tube surrounding said first feed tube and connected to a cylindrical endpiece surrounding said annular injection piece and having second injection orifices for discharging the secondary fuel into said combustion chamber, said endpiece further comprising an annular channel of diameter greater than that of said second feed tube and extending over its entire length beyond said first injection orifices; the system comprising means for delivering a cooling fluid comprising a third tube surrounding said second tube and having a tubular separation element connected thereto which is introduced in said annular channel of said cylindrical endpiece so as to form two annular spaces in which the cooling fluid can flow over 360° all the way to the end of the injector.

2/ A cooling system according to claim 1, wherein said first and second feed tubes and said third tube are coaxial.

3/ A cooling system according to claim 1, wherein said annular injection piece is connected to said first feed tube via a cylindrical connection piece.

4/ A fuel injector for a turbomachine combustion chamber, the injector including a cooling system according to claim 1.

5/ A cooling system for a main injector of a two-headed combustion chamber of a turbomachine, said main injector comprising an annular piece provided with a first injection orifice for discharging a primary fuel into said combustion chamber, said primary injection orifice being fed upstream from a first feed tube and having an endpiece surrounding said annular piece and provided with a second injection orifice for discharging a secondary fuel into said combustion chamber, said second injection orifice being fed upstream from a second feed tube,

wherein said endpiece includes an annular channel of depth that extends beyond said first injection orifice, said annular channel having a tubular separation element therein to define first and second coaxial annular spaces on either side of said element for cooling fluid flow, cooling fluid passing between said two annular spaces via through orifices formed in said separation element at a downstream end of said element resting on the bottom of the channel, and

wherein said tubular separation element is fixed upstream to a third tube surrounding said first and second feed tubes and co-operating firstly with said first feed tube to define a first annular duct which brings the cooling fluid from a fluid source via said first annular space to said endpiece, and secondly with an outer wall of the injector to define a second annular duct which returns the cooling fluid to said fluid source via said second annular space.

6/ A cooling system according to claim 5, wherein said first and second feed tubes and said third tube are coaxial.

7/ A cooling system according to claim 5, wherein said tubular separation element is brazed to said third tube which is connected upstream to the injector body.

8/ A main injector for a two-headed combustion chamber of a turbomachine including a cooling system according to claim 5.